UNIVERSITY OF TURKU

ABSTRACT

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Subject	International Business	Date	04.06.2019
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Title	Supplier selection in the circular economy. Case study of service providers in Finland		
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Abstract

With the increasing awareness of sustainable development when doing business, many companies are involving in promoting circular economy. Along with that, supplier selection would support the transformation from the company's traditional linear economy to the circular economy. The purpose of this research is to analyze the supplier selection activity in companies promoting the circular economy.

Extant literature for circular economy context, procurement process and supplier selection criteria are reviewed, which support the researcher to build an initial framework of supplier selection activity in a company towards the circular economy. The empirical research applies a qualitative approach with the use of three case studies which are service providers and are considered as pioneers in promoting circular economy in Finland. Data are collected in the form of semi-structured interviews as well as the information on companies' webpages. The data are analyzed first within-case, and to be followed by cross-case analysis through Nvivo system to recognize the similarities and differences among the case companies.

The research's findings show that companies would engage various stakeholders in the procurement process to promote the circular economy. Trust and transparency are significantly important elements in building a long-term collaboration between the purchaser and the supplier. Moreover, at the beginning of the procurement process, the purchaser should re-think about actual needs in order to minimize waste later. Last but not least, when selecting suppliers, both traditional criteria and green criteria related to environmental, social and ethical aspects are widely considered and the selection decision would be made based on the "price per service" that the supplier can provide.

This research contributes to the existing literature by analyzing the supplier selection activity in the circular economy practice and adding selection criteria. The research is helpful for companies building procurement strategy to develop the circular economy, as well as companies supplying materials or services to the sustainable market.

Key words	Supplier selection, sustainable procurement, circular economy

TURUN YLIOPISTO

TÓM TẮT

	Luận cử nhân
x	Luận án thạc sĩ
	Luận văn cấp bằng
	Luận án tiến sĩ

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Người hướng dẫn	Tiến sĩ Birgitta Sandberg Tiến sĩ Johanna Raitis		

Tóm tắt

Với nhận thức ngày càng tăng về phát triển kinh tế bền vững, nhiều công ty đang tham gia vào việc thúc đẩy nền kinh tế tuần hoàn. Lựa chọn nhà cung cấp cũng là một chiến lược quan trọng trong việc chuyển đổi từ nền kinh tế tuyến tính truyền thống sang nền kinh tế tuần hoàn. Mục đích của nghiên cứu này là để phân tích hoạt động lựa chọn nhà cung cấp trong các công ty đang thúc đẩy nền kinh tế tuần hoàn.

Lý thuyết về bối cảnh nền kinh tế tuần hoàn, quy trình mua sắm và các tiêu chí lựa chọn nhà cung cấp được xem xét. Dựa vào đó, tác giả xây dựng một mô hình ban đầu về hoạt động lựa chọn nhà cung cấp trong một công ty hướng tới nền kinh tế tuần hoàn. Nghiên cứu sử dụng phương pháp định tính với ba case study là các công ty tiên phong trong việc thúc đẩy nền kinh tế tuần hoàn ở Phần Lan. Dữ liệu được thu thập thông qua các cuộc phỏng vấn bán cấu trúc, kết hợp với những thông tin có sẵn trên trang web của các công ty. Khi phân tích dữ liệu, đầu tiên tác giả phân tích dữ liệu theo từng công ty, và sau đó tác giả phân tích dữ liệu chéo giữa các công ty thông qua hệ thống Nvivo để nhận ra những điểm tương đồng và khác biệt.

Kết quả nghiên cứu cho thấy các công ty thường hợp tác với nhiều bên liên quan trong quá trình mua sắm để thúc đẩy nền kinh tế tuần hoàn. Sự tin tưởng và minh bạch là những yếu tố quan trọng trong việc xây dựng sự hợp tác lâu dài giữa người mua và nhà cung cấp. Hơn nữa, khi bắt đầu quá trình mua sắm, người mua nên suy nghĩ kỹ về nhu cầu thực tế để giảm thiểu chất thải sau này. Cuối cùng nhưng không kém phần quan trọng, khi lựa chọn nhà cung cấp, các tiêu chí truyền thống và các tiêu chí "xanh" liên quan đến khía cạnh môi trường, xã hội và đạo đức đều được xem xét rộng rãi. Quyết định lựa chọn nhà cung cấp sẽ phụ thuộc vào giá của dịch vụ mà nhà cung cấp có thể mang lại cho người mua.

Nghiên cứu này đóng góp cho lý thuyết hiện hành thông qua phân tích sâu về hoạt động lựa chọn nhà cung cấp kinh tế tuần hoàn và thêm các tiêu chí lựa chọn liên quan đến vấn đề đạo đức. Nghiên cứu này hữu ích cho các công ty đang xây dựng và hoàn thiện chiến lược mua sắm để phát triển nền kinh tế tuần hoàn, cũng như các công ty cung cấp nguyên liệu hoặc dịch vụ cho thị trường bền vững.

Từ khoá	Lựa chọn nhà cung cấp, mua sắm bền vững, nền kinh tế tuần hoàn

UNIVERSITY OF TURKU
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SUPPLIER SELECTION IN THE CIRCULAR ECONOMY

Case study of service providers in Finland

Master's Thesis
in International Business

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I would like to thank my supervisors D.Sc. Birgitta Sandberg and D.Sc. Johanna Raitis for their support and guidance throughout the process of this thesis. I also would like to thank all the interviewees for accepting me to interview them and to learn about their companies' procedures. Finally, I wish to thank my parents and friends for motivating me during the study of this master's degree in Finland.

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1 INTRODUCTION

1.1 Supply chain management moving towards sustainability

Sustainability has become a dominant trend and a familiar term in both business and many other aspects of society (Carter & Easton 2011, 46). In September 2015, the United Nation launched its seventeen sustainable development goals as the focus of "Agenda 2030". These goals play an important role in building a roadmap for business growth in the next ten years. According to Hopwood et al. (2005, 38), many human issues related to environment and socio-economy in current life as well as in the future could be solved by sustainable development. That might be one reason why many more companies and organizations pursue sustainable development goals and aim to accomplish those goals in the next ten or twenty years. According to a PwC report in 2015, 71% of businesses were planning to engage sustainable development goals, and 41% of businesses said that they would embed sustainable development goals into their strategies within five years (PwC 2015).

Furthermore, in daily life, more people aware of environmental and social issues, and they are care more about sustainability in their life. In developed countries such as Finland and Germany, there is a growing number of people choosing a vegetarian or vegan diet in order to protect the environment and animals. Besides, in developing countries, youngsters start adopting green habits, for instance, using fewer plastic bags when shopping. Along with that, environmentally friendly products such as paper bags, bamboo drinking straws, and wooden toothbrushes become more popular in the market. In various research about purchasing behavior, the majority of consumers say that they would spend more money or change their consumption habits in order to reduce negative impacts on the environment; and almost half of consumers responded that they are willing to pay more for all-natural or organic products (The Nielson Company 2019).

However, in order to manufacture such environmentally friendly products, and further to achieve sustainable goals, a company needs to have proper suppliers who can supply "green" goods and services. Selecting suitable suppliers would assist the company to better manage resources and inventory as well as to support many other activities such as cash flow requirement, production planning, and product quality (Narasimhan 1983, 27). Although supplier selection happens frequently in running a business and is an important task, it is not an easy task for the purchaser, and it requires a lot of analytical skills and knowledge about the market. Moreover, when a company pursues sustainable development strategy, the activity of selection supplier might need to be followed a

number of extra green criteria. Take Tetra Pak, a Swedish packing company, as an example, one of their requirements for their paperboard suppliers in 2018 is not using wood from any form of deforestation that disrupts the natural forestry cycle (Scott 2019). Therefore, careful consideration of supplier selection in the sustainability context would bring benefits both for the purchaser and the supplier.

In an organization, many functions are interacted and can be exited simultaneously, for example, procurement, sourcing and purchasing. In the book Purchasing and Supply Chain Management, Weele (2009, 12) writes that "In practice, as well as in the literature, many terms and concepts nowadays are used in the area of purchasing. However, no agreement exists about the definition of these terms. Terms like procurement, purchasing, sourcing, and supply management are used interchangeably". Based on the definition by Weele (2009, 14), in this research, procurement refers to purchasing and all activities implemented by the purchaser in order to receive products or services from the supplier. Along with that, supplier selection is determined as a stage in the procurement process which belongs to supply chain management.

Regarding supply chain management, it is defined as "the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole" (Christopher 2005, 5). There is no doubt that sustainable supply chain management is one prominent topic which has a connection with sustainability. Through sustainable supply chain management, companies are able to implement social corporate responsibility in practice, and to improve effectiveness in logistics administration and resource management at the same time of pursuing sustainable development goals. (Beske et al. 2014, 131.) In the sustainable supply chain, companies start to adopt a closed-loop approach since they are considering environmental issues. Compared to the traditional supply chain, in a sustainable context, the materials are kept in use in a longer period of time and aim to be recycled. (De Angelis et al. 2017, 429.)

One interesting example of sustainable supply chain management is the "Loop" project. In 2019, the global recycling organization "TerraCycle" launched the project as a new delivery service for consumers. The project has been supporting the reusable and returnable system of many consumer-goods companies such as Unilever and Mondelez International. Particularly, the "Loop" project is a circular shopping platform that replaces single-use packaging with reusable or fully recyclable packaging. Once the products are used, customers put empty packages back into the "Loop" tote which will be picked up free. Then, the system delivers those empty packages to its partners in order to make sure

the products get automatically refilled. (Danigelis, 2019.) Therefore, such projects would help to reduce significantly the amount of plastic waste, and further support consumer-goods companies to achieve sustainable development goals.

Being a component of sustainable supply chain management, researchers agree that sustainable procurement practices can promote sustainable development through transferring markets, improving financial capability, enhancing the competitiveness of eco-industries, saving resources, and creating jobs. The concept of sustainable procurement is about purchasing with environmental, social and ethical responsibility. As a result, sustainable procurement is considered as a key strategy for companies seeking to expand globally by encouraging foreign investments, increasing international market share; and the organizations' performance has become an essential part of the sustainable procurement system. (Islam et al. 2017, 1-3.) Moreover, the connection between sustainable procurement and company image, innovation, strategic targets and competitiveness is very strong and positive (Islam et al. 2017, 3; Adjei-Bamfo et al. 2019; Bag 2012). As a result, building a more sustainable procurement strategy becomes a priority for businesses.

Along with sustainability term, since several recent years, the concept of circular economy has gained more recognition (Geissdoerfer et al. 2017, 757). There are more and more journal articles and practical solutions related to the circular economy due to the increasing awareness of resource scarcity. Regarding the benefits of the circular economy, according to Ellen Macarthur Foundation report (2013, 9), the circular economy would bring advantages to both economies, companies, and consumers/users. Particularly, the circular economy helps economies to save material cost, to reduce supply risks and price fluctuations, to increase jobs in services, and to benefit economic growth. Furthermore, companies can increase financial values, gain more competitive advantages, improve customers loyalty, and build resilience against strategic challenges. Last but not least, as for customers and users, the benefits of the circular economy are related to the increased choices for products at a lower cost, and the contribution to social benefits such as reducing impacts on climate change. (Ellen MacArthur Foundation 2013, 9-11; Lewandowski 2016, 2.)

Scholars agree that the circular economy is operated in contrast to the traditional linear economy which is based on a "take-make-dispose" sequence. (Geisendorf & Pietrulla 2018, 771.) This circular economy concept is created to help improve the shortage of raw materials and energy, achieve sustainable development goals, while at the same time support economic growth. Leipold and Petit-Boix (2018, 1126) state that the ultimate aim for companies engaging circular economy is sustainability since it is crucial for businesses

to consider global environmental change and it is a business opportunity in the era of resource deficiency. Since the circular approach differs from the traditional linear business, circular business models, therefore, are developed to continually reuse products and materials at the same time to use renewable resources if possible.

1.2 Purpose of the study

When searching for supply chain management in the circular economy context, there are limited studies focusing directly on supplier selection activity. Although there is literature looking to general sustainable supply chain (for example, De Angelis et al. 2017, Genovese et al. 2007, Manavalan and Jayakrishna 2019), and the collaboration of the purchaser and the supplier in sustainable procurement (Miemczyk et al. 2012, Witjes and Lozano 2016), little attention is paid to the supplier selection activity as well as the criteria used to select suitable suppliers towards the circular economy. Consequently, the purpose of this study is to research how suppliers are selected in companies promoting circular economy. Two sub-research questions are used to achieve the research's purpose:

Sub-RQ1: How the circular economy impacts the procurement process?

Sub-RQ2: What criteria are considered to select suppliers in the circular economy?

Firstly, as supplier selection activity belongs to the procurement process, in order to understand how the circular economy impact supplier selection activity, it is important to examine the impact of the circular economy on the procurement process. To answer the first sub-question, in literature review part, circular economy principles and characteristics are defined to create a background knowledge about the circular economy concept. While the principles help to understand the fundamental actions in the circular economy, the elemental characteristics describe the nature of the concept. After that, overall procurement process and procurement in sustainability context are reviewed. Based on that, the researcher would analyze the influence of circular economy principles and characteristics on the procurement process.

Furthermore, when selecting suppliers, the purchaser usually has a list of criteria to compare and evaluate potential suppliers. According to Weber et al. (1991, 14), a purchaser would consider quality, price and delivery as main concerns among various criteria. However, in the circular economy context, when consumers put more attention to environmental matters, and the market has been transferred, some new supplier selection criteria would be added. It might be green criteria which mainly involve environmental protection and waste management. As a result, the second sub-research question focuses on the criteria in supplier selection as firms move towards the circular

economy. To answer the second sub-question, the researcher reviews and gathers various criteria in selecting suppliers, including traditional criteria and green criteria.

This study is organized as follows. Chapter 2 provides the literature review on the circular economy principles, its characteristics and business models in order to construct a fundamental knowledge for the circular economy concept. This chapter also examines the procurement process in the sustainability context and reviews various criteria when select suppliers. This is followed by an initial synthesis framework on supplier selection towards the circular economy. In chapter 3, the researcher outlines the research strategy, data collection, trustworthiness of the research. The section explains the choice of method applied in the study. Later parts of the chapter focus on the methods used for data collection and analysis of the data to arrive at the results. Chapter 4 discusses the findings of the study. Chapter 5 explains the study contributions to theoretical and managerial aspects as well as provides limitations of this research and suggestions for further studies. The final chapter summarizes the study.

2 LITERATURE OF CIRCULAR ECONOMY AND SUPPLIER SELECTION ACTIVITY

2.1 Circular economy

2.1.1 Circular economy principles

According to Kirchherr et al. (2017, 221), the concept of the circular economy is popular in both academic and practical literature for several recent years. One of the most well-known definitions about circular economy is defined by Ellen MacArthur Foundation (2015a, 2), "A circular economy is one that is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles". Besides, European Commission also gives description: "In a circular economy the value of products and materials is maintained for as long as possible; waste and resource use are minimized, and resources are kept within the economy when a product has reached the end of its life, to be used again and again to create further value" (European Commission 2015, 1). In order to understand more the meaning of the circular economy, it is practical to consider the term of the linear economy which is largely used during the 20th century. On the one hand, the linear model of production and consumption refers to the process that goods and services are made, sold, used and disposed of as waste after they completed their functions (Bonciu 2014, 88). On the other hand, the circular economy is based on "closing loops" through different recovery's levels (Yuan et al. 2006, 6) by "transforming material into useful goods and services through resource efficiency" (Webster 2013, 543).

Because the origin of the circular economy is to close the materials' flow and to use the materials and energy over various phrases, there are three main principles of the circular economy applied in practice, including reduce, reuse and recycle, which are known as "3R" principles (Yuan et al. 2006, 5). These "3R" principles play parts of the process and contribute to particular hierarchical importance (Su et al. 2013, 216). Inigo and Blok (2019, 283) argue that the attention to each principle is different in particular geographical areas. For example, in China, Reduction is the main goal due to the concerns of resource deficiency for mass production; whereas European policies tend to focus more on Recycle to minimize the amount of waste and to develop upcycling-based industry

(Inigo & Blok 2019, 283). However, in order to achieve the ultimate goals of sustainability, it is crucial to balance the three principles and to apply a systemic perspective when examining the circular economy concept (Webster 2013, 553).

The first "R" principle is Reduce. According to Su et al (2013, 216) and Ghisellini et al. (2016, 15), reduction means reduce the input amount of resources through the improvement of efficiency in production and make less consumption. Companies can improve their production efficiency such as increasing the products' values while minimizing negative impacts on the environment through using fewer resources per unit or taking the place of harmful material by eco-friendly material (Figge et al. 2014, 217). Besides, on the consumption side, the reduction can also be executed by building up a simpler lifestyle, creating more productive household devices, or applying smarter approaches such as making simple packaging of products delivered. (European Commission 2017, 10; Zhijun & Nailing 2007, 95)

The second "R" principle is Reuse. In this level, Su et al. (2013, 216) explain that the used-items and wastes from one company can be considered as the input resources for other firms or industries. A similar explanation for this reuse level is using the waste as products, either in the same function or in others (Hu et al. 2011, 222). Therefore, "the products are used in maximum capability with frequent maintenance and reclamation to prolong its endurance" (Su et al. 2013, 216). The reuse of items or components brings many more significant benefits to the environment, economy and society since it uses fewer resources, less energy, less labor, when compared with producing new products as normal, or even when compared with recycling or disposal (Castellani et al. 2015, 374; Ghisellini et al. 2016, 15). That might be one reason why in the waste hierarchy, reuse is considered at the top among other waste management approaches. (Castellani et al. 2015, 374.) Besides of promoting resource efficiency, according to Castellani et al. (2015, 374), reuse of products makes less air, water, and soil pollution by preventing the emission of contamination from textile products, furniture, glass, and so on.

According to Ghisellini et al. (2016, 16), Geisendorf and Pietrulla (2018, 773), reuse also indicates the development of product design and company business model in order to implement "a cycle of disassembly and reuse". Besides, to achieve certain economy of scale, Stahel (2013, 6) suggests that activities linked with reuse principle such as remanufacturing should be implemented regionally, so that the cost for transportation and packaging would be cut down. However, the consumers play an important role to conduct this approach since it requires the willingness to spend money on reusable and reproduced goods. Particularly, the diffusion of reuse is affected by the increasing demand of

consumers towards those items, the appropriate design of products, and the convenience that companies can take-back products (Ghisellini et al. 2016, 15-16). As a result, companies are encouraged to push more effort on marketing strategy and further to change consumers behaviors as well as to educate them regards shared responsibility between manufacturers and users to collect reusable products. (Geisendorf & Pietrulla 2018, 773.)

The third "R" principle is Recycle. Recycle refers to creating new products by processing recyclable materials, so that the amount of raw materials can be minimized (Su et al. 2013, 216). This level uses the wastes as input resources after collecting, separating and adjusting process in which core physical and chemical properties of materials still remain (Hu et al. 2011, 222). Through this approach, new products or materials are manufactured from waste, either for the initial or other purposes. As a result, recycling of waste certainly supports to diminish the environmental problems by offering the opportunities to reuse several resources and to reduce the amount of trash that goes to landfills (Cagno et al. 2005, 595; Lazarevic et al. 2010, 258).

According to Stahel (2013, 4) and Ghisellini et al. (2016, 16), among the "3R" principles, Recycle would be the least sustainable solution regards resource sufficiency and profitability compared with two other principles, namely Reduce and Reuse. Some materials have difficulties to perform closed-loop recycling and, can only be recycled until a particular level or even are unrecyclable. For instance, textile waste may be recycled several times while some types of plastic that mixing of contaminants such as ink and metals are not recyclable. (Prendeville et al. 2014, 10.) Therefore, some authors such as Stahel (2013) and Ghisellini et al. (2016) raise the discussion on recycling mixed materials and highlight the importance of developing new chemicals and products at the global level. While reuse, repair and remanufacture, which are mainly implemented in local or regional dimensions, can avoid packaging and transport costs; recycling has a global dimension (Ghisellini et al. 2016, 16) and based on the "principles of industrial production such as economic scale, specialization and employing the cheapest labor" (Stahel 2013, 4).

2.1.2 Circular economy characteristics

Based on the circular economy definition and its principles, Joustra et al. (2013, 3) believe that circular economy step by step becomes a new vision of resources and energy

management, value creation as well as entrepreneurship. Different from the traditional linear model, circular economy pursues and creates conversions from “end-of-life” concept to “closed-loops”, from using unrenewable energy to sustainable energy, from much waste to zero waste through the product design, system and business models. Thus, Ellen MacArthur Foundation (2015b) provides five main characteristics of the circular economy: (i) Design out waste/ Design for reuse, (ii) Build resilience through diversity, (iii) Rely on energy from renewable sources, (iv) Think in systems, and (v) Think in cascades/ Share values.

Firstly, regarding design out waste characteristic, the product design affects directly to product life, the amount of raw material or energy, and waste to landfill. Lewandowski (2016, 18) specifies that appropriate design would extend product lifecycle, enable using fewer resources, reduce toxic waste to the environment, and facilitate closing material loops for products and components. In the circular economy, products are designed in a way to reduce waste as much as possible by using biological or less harmful materials. Particularly, natural materials, which are pure and harmless, can be easily returned into the soil by composting. In contrast, unnatural materials such as plastics and polymers should be modified to save the value and minimize the energy used for materials changing. (Ellen MacArthur Foundation, 2015b, 7.) Additionally, according to Lewandowski (2016, 16), circular products have particular features in connect with circular economy principles. Circular products could prolong product life through maintaining, repairing, refurbishing, and reselling. Those products are designed to increase reusing and recycling, so that they could participate in the closed material loops. Product design is suggested to use less raw material and energy in order to diminish negative impacts on the environment. (Lewandowski 2016, 16.) Furthermore, Lewandowski (2016, 16) states that circular products “can be also dematerialized and offered not as physical but as virtual products”. Sustainable product design with a focus on circular thinking and innovation can be achieved through company internal capability and connections with stakeholders (Joustra et al. 2013, 11).

Secondly, because diversity serves as the main driver of flexibility and resilience in various systems, in circular economy diversity is valued as a mean of building strengths (Ellen MacArthur Foundation, 2015b, 7). The balance among different scales of businesses would help economies to develop actively in the long term. When faced with external shocks, varied systems with numerous connections and scales would be more flexible and adaptable, compared with systems just focusing on maximization of efficiency. Particularly, while global companies contribute a large volume of production

and efficiency to maintain prosperity, smaller firms would easily offer alternative business models in cases of crisis. (Ellen MacArthur Foundation, 2013, 22.) As a result, different kinds of diversity such as customer relations, supplier relations, resource and innovation would support the elasticity of circular economy (Joustra et al. 2013, 9).

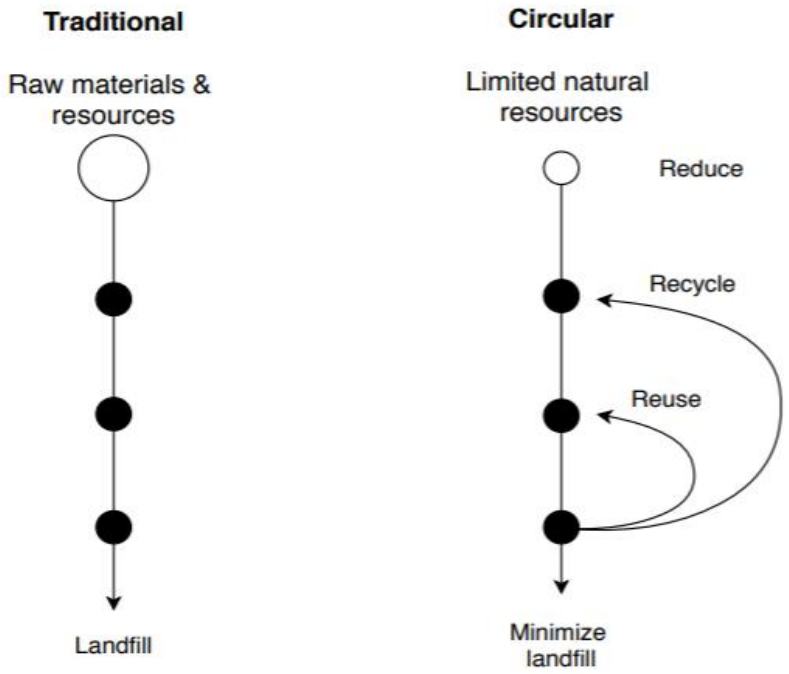
Thirdly, that is no doubt that businesses need energy; however, the energy used for the circular economy should be renewable by nature such as solar and wind energy in order to decrease the reliance on the resource as well as to increase the resilience. Particularly, the use of renewable resources will help to reduce the dependence on market prices and supply fluctuations of non-renewable resources. (Ellen MacArthur Foundation 2015b, 8.) Besides, the production and consumption of renewable energy usually are less polluting and release lower carbon emission than those activities of oil or fossil fuels (Wijkman & Skånberg 2015, 6).

Fourthly, applying system thinking in circular economy enables the improvement of products and services (Perey et al. 2018; Ellen MacArthur Foundation, 2015b). System thinking is a perspective of seeing and understanding the businesses as a just one part in a wider whole, rather than a collection of parts (Perey et al. 2018, 632). Since the aim of the circular economy is to close the loops of both materials, products and responsibility; it needs to consider the collaboration among businesses, plants, people in order to transitive effectively. This might be the feedback loops which provide the manufacturers with information on the quality of reuse or recycle of products and resources (Joustra et al. 2013, 9). Besides, Lewandowski (2016, 18) agrees that cooperative network between the company and its supplies is crucial since it allows to optimize advantages from suppliers and supports many related activities such as product design, marketing, finance, and management. Therefore, without collaboration, it seems impossible to achieve circularity in the circular economy.

Fifthly, the total costs in developing circular economy should be reported and calculated, and they should reflect the real expenses (Ellen MacArthur Foundation 2015b, 8). For the shift to the circular economy, unfavorable external factors have to determined clearly. When a company changes its business model, it would relate to the change in cost structure and further organizational changes such as staff behavior. Cost structure can help to evaluate the performance of optimization policies and usually taken into account when considering the potential benefits of the circular economy. (Lewandowski 2016, 19.) Moreover, from the customers' point of view, they may prefer purchasing goods to leasing or renting them due to uncertainty and insecurity about financial matters.

Transparency about contract terms and effective of marketing regards customers benefits would help to solve these concerns. (Ellen MacArthur Foundation 2013, 49.)

Based on the circular economy principles and characteristics, De Angelis et al. (2017, 429-430) synthesize and highlight the key differences between traditional and circular supply chain in figure 1.



Themes	*Traditional supply chain*	*Circular supply chain*
Strategy	Component price	Leasing and service outcome
Structure	Linear and open	Closed loops
Flow	Input, Output	Biological and technical cycles
Focus	Efficiency	Collaborative value capture
Scale	High volume	Medium-low volume
Scope	Global	Regional

Figure 1 Differences between traditional and circular supply chain (adapted from De Angelis et al. 2017, 430).

Regarding the traditional supply chain, it involves upstream and downstream process and aims to deliver values at less cost. Thus, the traditional supply chain emphasizes on cost and the volume of material passing through the process. The system tends to apply linear thinking around inputs and outputs, and focuses on high levels of efficiency. The fast-moving consumer-goods sector is a typical model of the traditional supply chain. (De

Angelis et al. 2017, 427.) Differently, the circular system focuses on access instead of the ownership, which helps to improve the capacity utilization and resources efficiency (Planing 2015, 3). In the circular supply chain, organizations try to minimize the use of resources and hazardous waste to landfill. As a result, a closed-loop approach is applied to extend the products lifecycle by using a number of continuous technical cycles of reusing and recycling. Furthermore, in the circular economy, consumables are made of biological materials which can be returned to nature without risk of harm. Instead of focusing on a large scale with high capacity, the circular supply chain aims to improve resource usage and to facilitate product-service continuation. Scale and scope, therefore, have been narrowed down with on more regional concentration. (De Angelis et al. 2017, 429-430.)

Along with that, Sitra (2019) lists five circular economy business models that most value creation of companies come from, including (i) product as a service, (ii) renewability, (iii) sharing platforms, (iv) extending the product life cycle, and (v) resource efficiency and recycling. Firstly, with the product as a service business model, companies provide services instead of products. Secondly, companies promoting renewability would use renewable and recyclable resources to produce products. Thirdly, sharing platforms business model maximize the usage of resources and extending product cycle by applying digital platforms for renting, selling or sharing. Fourthly, in the product-life extension business model, products are used as long as possible through maintenance, repair and refurbishment. Lastly, companies following resource efficiency and recycling business model would bring solutions to collect and reuse of resources that have reached the end of their life cycle.

Nevertheless, Planing (2015, 3-4) argues that these circular business models only describe the inner circle of a circular economy which targets to close the product loops. With the goal to develop a truly circular economy, in a broader perspective, it requires ideas for the reduce, reuse and recycle of materials as well as energy recovery in an increasingly global supply chain. Therefore, circular economy business models also need a more complex system of actors such as suppliers and authorities. (Planing 2015, 3-4.)

2.2 Procurement in sustainability context

2.2.1 General procurement process

Although procurement process can run in different ways based on particular products and company's strategies, it would be implemented by purchasing department through automated steps. In literature, the procurement includes several specific stages which are related to purchasing or buying process. According to Webster and Wind (1972, 16), a buying decision process can be defined as five stages: (i) identification of need, (ii) establishing objectives and specification, (iii) identifying buying alternatives, (iv) evaluating alternative buying actions, and (v) selecting of suppliers. He also clarifies that many factors such as individual, social, organizational environment could influence purchasing behavior (Webster and Wind 1972, 16).

Witjes and Lozano (2016, 38) site that there are four main stages of the procurement process, including (i) preparation stage, (ii) specification stage, (iii) sourcing stage, and (iv) utilization stage as shown in Figure 2.

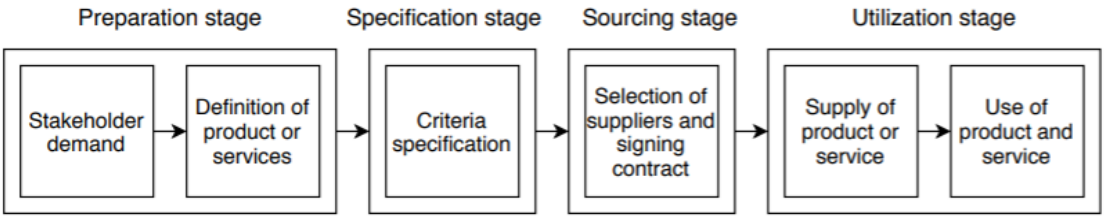


Figure 2 Procurement process (adapted from Witjes and Lozano 2016, 38).

Firstly, in the preparation stage, the products and services are defined, and the inventory is made based on the demands of internal and external stakeholders. This stage would create the first set of requirements. Secondly, in the specification stage, a list of criteria for specifications of products and services are specified. Thirdly, in the sourcing stage, the products or services specifications are opened to potential suppliers, and then the selected supplier and the purchaser would sign on the sourcing contracts. Lastly, after signing the contract, the products or services are provided and used in the utilization stage. (Witjes & Lozano 2016, 38.)

In the book Purchasing and supply chain management, Weele (2009, 14) argues that procurement is a larger term compared to purchasing or buying. Procurement involves

the whole purchasing process, and many related activities such as stores, transportation, and insurance. The purchasing process model includes six main steps as illustrated in Figure 3, including (i) determining specification, (ii) selecting supplier, (iii) contracting, (iv) ordering, (v) expediting, and (vi) following-up and evaluation.

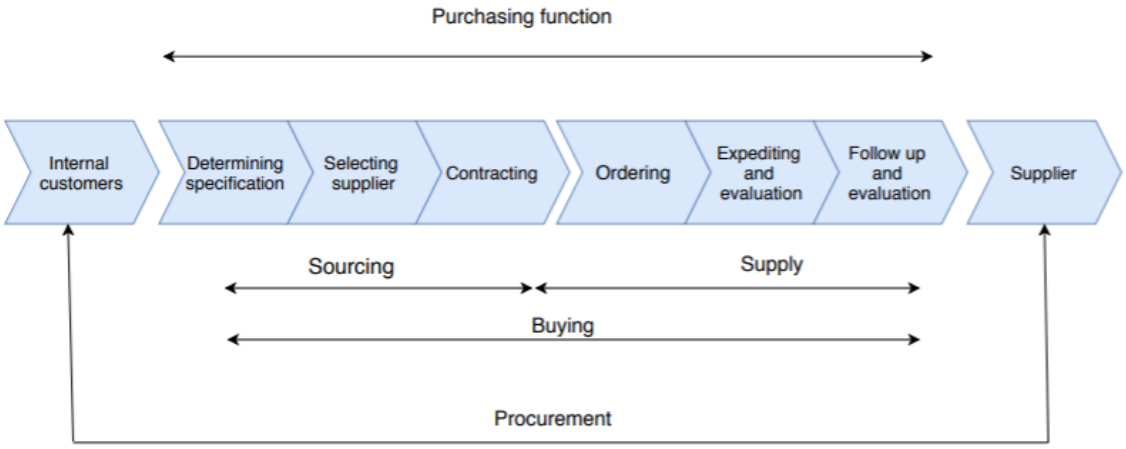


Figure 3 Purchasing process model (adapted from Weele 2009, 13).

Weele (2009, 13) clarifies six main aims of purchasing function. The first aim is determining the quality and quantity specification of the products and services that need to be procured. The second aim is improving the supplier selection procedures and selecting the most appropriate supplier. The third aim is negotiating and agreeing on the contract terms and legal issues with the supplier. The fourth aim is placing the order to develop an efficient purchase order. The fifth aim is controlling the order to secure supply. Finally, the sixth aim is following up and evaluating the supplier performance. He also mentions that some firms consider environmental issues as part of procurement since those issues are related to materials. (Weele 2009, 13-14.)

With the purpose of concentrating on the supplier selection activity, this research would focus on several stages in the procurement process, including products and services definition stage, specification stage, sourcing stage, and utilization stage. According to Witjes and Lozano (2016, 38), the sourcing stage is a key stage because it links the products or services' specifications with the potential suppliers. With the public of quality and quantity products or services' requirements, the suppliers might need to improve their business model to meet the purchaser's criteria. According to Uyarra et al. (2014), in traditional procurement, the effect of the procurement process on a company's business model is usually linear, and the main focus of negotiation is the "price per product unit". In order to meet the purchasers' technical specifications such as size and color, the

supplier specifies needed raw materials for the manufacturing process, then provide to the purchaser as the requirement. After being used, the products partly become waste and the purchaser would think of where to dispose of it. Therefore, “the optimization of used raw materials or generated waste is not explicitly addressed in the products technical specifications” (Witjes & Lozano 2016, 38.)

2.2.2 Sustainable procurement

Back to the definition of sustainable supply chain management, Seuring and Müller (2018, 1700) define that “sustainable supply chain management as the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development ,i.e., economic, environmental and social, into account which are derived from customer and stakeholder requirements”. Based on this definition, Beske et al. (2014, 132) clarify three key points about sustainable supply chain management. Firstly, it promotes collaboration among partners in the value chain in order to strengthen their relationship. Secondly, three dimensions of sustainability namely economic, environmental and social dimensions are considered equally. Thirdly, it draws attention to the stakeholders of the supply chain, including customers, non-government organizations, suppliers and government. (Beske et al. 2014, 132.)

Being a part of sustainable supply chain management, sustainable procurement has supported value creation for organizations and contributed to sustainable development (Islam et al. 2017, 14). As defined by UNEP (2011, 12), “Sustainable procurement integrates requirements, specifications and criteria that are compatible and in favor of the protection of the environment, of social progress and in support of economic development, namely by seeking resource efficiency, improving the quality of products and services and ultimately optimizing costs.” Along with this definition, three key principles underpinning sustainable procurement are economic factors, social and labor factors and environmental factors. Economic factors refer to the entire lifecycle costs of products and services as well as the end-of-life management cost including waste disposal. While social and labor factors include developing local communities and infrastructure, increasing employment rate, ensuring equality and diversity as well as working conditions. Besides, environmental factors care about climate change, emissions to the air, and usage of natural resources through the life cycle of products. (UNEP 2011,

13.) UNEP (2011, 14) clarifies that sustainable procurement is not about putting more burdens on suppliers with extra criteria, but it is based on executing a clear strategy, step by step meeting sustainable requirements in the procurement process. Therefore, it requires support methods, communication and cooperation between the purchaser and the supplier.

When putting the procurement in the sustainability context, the collaboration between the supplier and the purchaser is closer throughout the procurement process. In traditional procurement, the collaboration between the purchaser and the supplier is closest in the sourcing stage where the supplier is selected and contracted. However, in sustainable procurement, such cooperation develops from the preparation stage to the sourcing stage and maintains to utilization stage. Furthermore, the purchaser tends to care more about the value of money, where environmental and social requirements are added. As a result, the main focus of negotiation switch from the price per product unit in the linear economy to the price per delivered service in the circular economy. (Witjes & Lozano 2016, 41.) Along with that, closing loops and improving resource efficiency become two significant elements in the process. After linking the sustainable procurement process and sustainable business models, Witjes and Lozano (2016, 42) propose a collaboration framework between procurement and business model in the circular economy as shown in Figure 4.

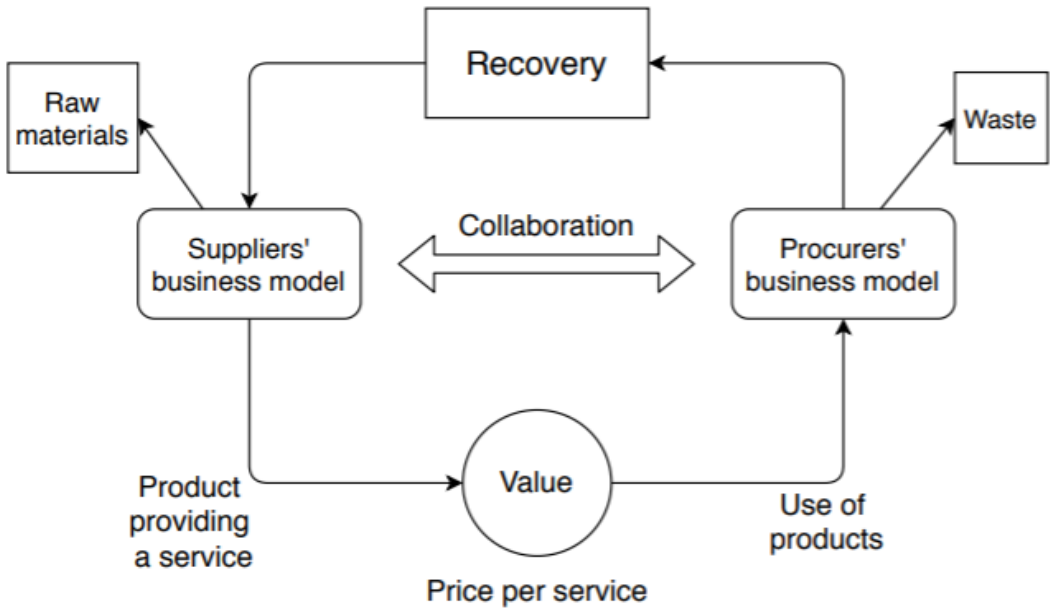


Figure 2 Collaboration framework between procurement and business models for circular economy (adapted from Witjes and Lozano 2016, 42).

With the increasing concerns over sustainability issues, a company can obtain experience in defining and designing products to close loops and to optimize resources usage (Mont 2002). The purpose of companies promoting circular business models is to reduce both the input - raw materials and the output – waste. Therefore, the framework focuses on product-service system. In the framework, the collaboration promotes further communication and partnership between the purchaser and the supplier. Such cooperation would help the purchaser and the supplier companies to share responsibility with each other as well as to define the technical and non-technical requirement of the products or services. Consequently, the main negotiation between the purchaser and the supplier is the "price per service" of a functional unit that the supplier provides. The success of the framework would reply upon the shared ownership of the product-service system, and the collaboration between two parties from the early stages of the procurement. (Witjes & Lozano 2016, 39-41.)

2.3 Supplier selection criteria in sustainability context

2.3.1 Criteria of traditional supplier section

According to Weber et al. (1991, 2-3), supplier selection decision is one of the significant and complicated features of purchasing function because this decision-making process must consider various criteria. The criteria would include quantitative and qualitative element and might be conflicting with each other. Therefore, it is essential to consider diversified criteria when a company builds a strategic approach towards purchasing. (Boer et al. 1998, 110.) Ellram (1990, 11) emphasizes that in strategic supplier selection, both traditional criteria such as quality and price and longer-term criteria such as future manufacturing capability need examining.

Since a long time ago, many researchers agreed that quality, delivery and price are dominant criteria to select suppliers. According to Pal et al. (2013, 2670), pricing structure, delivery, product quality, and service are basic traditional criteria that are used for selecting suppliers. With the development of global trade, companies might select suppliers worldwide since many developing countries own lower labor and operation costs. Along with that, Pal et al. (2013, 2670) conclude that a large percentage of purchasers consider "cost" as a priority, and few more mutual selections criteria are gradually being used. However, after conducting a survey with various procurement managers, Verma

and Pullman (1998, 747) argue that quality is the most important criteria, followed by delivery and price. Research on supplier selection criteria continues with many other conclusions such as Karpak et al. (2001) acknowledge the reliability of delivery as a main criterion, and Krause et al. (2001) indicate the necessary to add innovation as a contemporary criterion.

Weber et al. (1991) rank the significance of criteria after reviewing a number of articles which address supplier selection criteria as listed in Table 1.

Table 1 Supplier selection criteria (adapted from Weber et al. 1991, 14).

Criteria	***The importance of criteria***
Quality	Great importance
Delivery	
Net price	
Production facilities and capabilities	Low importance
Geographical location	
Technical capabilities	
Management and organization	
Reputation	
Financial position	
Performance history	

The table shows that the most three important criteria in supplier selection are net price, delivery and quality. Weber et al. (1991, 14) note that the net price in the list is understood as a component of "total vender cost", not a separate component. Besides those three important criteria, production capabilities and geographical location are also considered as significant "just in time" criteria. Other criteria that more frequently mentioned in the supplier selection literature are technical capability, management, reputation, operational control, and performance history. With a number of criteria, qualitative approaches are usually used to select the supplier. According to Weber et al. (1991, 14), the most common approach would be based on a linear weighting model which gives a weigh on each criterion. After summarizing all such weights, the suppliers are ranked by their total score (Weber et al. 1991, 14).

2.3.2 Criteria of green supplier selection

Following the sustainable supply chain strategy, a very large set of criteria are used in the supplier selection, and are mentioned in some literature under the keyword “green criteria”. As defined by the High Level Committee on Management Procurement Network (2009, 1), “Sustainable procurement integrates requirements, specifications and criteria that are compatible and in favor of the protection of the environment, of social progress and in support of economic development, namely by seeking resource efficiency, improving the quality of products and services and ultimately optimizing costs”. As a result, besides traditional criteria, green criteria also play a substantial part when the purchaser selects “green” suppliers in the sustainability context.

Lee et al. (2009, 7918) comment that the purchasing process became more complicated when added environmental criteria. The reason is the purchaser has to evaluate the supplier’s environmental responsibilities besides traditional criteria. The authors also list main criteria for evaluating green suppliers, including quality, technology capability, total product life cycle cost, green image, pollution control, environmental management, green product, and green competencies (Lee et al. 2009, 7922). Similarly, according to Lu et al. (2007), main criteria for green supplier selection are (i) environmental criteria such as material and energy use, and (ii) criteria related to supply chain stages such as product manufacture and distribution, and price.

After reviewing literature related to criteria and approaches for green supplier selection, Govindan et al. (2015, 69) conclude that environmental management system is the most widely considered criterion for green supplier selection. “This major criterion is followed by a green image, environmental performance, environmental competencies, design for environment, green competencies, corporate and social responsibilities, environmental efficiency, environmental authentication, environmental improvement cost, green logistic dimension, green organization activities, environmental certification, suppliers’ green image, use of environmentally friendly material, use of environmentally friendly technology, waste management, reuse, recycle, green process innovation, green product, green purchasing, green project partnership and green design” (Govindan et al. 2015, 70).

Chiou et al. (2008, 1909-1910) also comprehensively identify a number of criteria for green supplier selection and group into six main criteria as detailed in table 2, including (i) supply chain base, (ii) green competencies, (iii) environmental management systems, (iv) environmental performance, (v) corporate social responsibilities, and (vi) risk factor.

Table 2 Criteria of green supplier selection (adapted from Chiou et al. 2008, 1909-1910).

Main criteria	***Sub-criteria***
Supply chain base	Cost
	Quality
	Delivery schedule
	Service performance
Green competencies	Green material selection
	Cleaner production technologies
	Reduced green packaging
	Reserve logistics
Environmental management system	ISO-14001 certification
	Eco-labeling
	Supplier environmental evaluation
	Environmental management system
Environmental performance	Green design
	Use of restricted substances
	Remanufacturing
	Waste management
Corporate social responsibilities	Public disclosure of environmental record
	Green image
	Relationship with stakeholders
	Contribution to community
Risk factor	Government and local rules
	Political stability
	Supply's credit
	Internal management system

Regarding supply chain base criteria, they are similar to criteria of traditional supplier selection. Because the cost minimization would lead to profit maximization, having a low-cost supplier could help firms to reduce the amount of cost related to purchasing, transportation, documentation and so on (Min 1994, 26). Quality of goods or services is usually ranked as a main selection criterion since it impacts directly to the purchaser's products or services. Moreover, when choosing a supplier, the purchaser should evaluate the supplier's assurance for "on-time delivery services" (Min 1994, 26). In addition to cost, quality and delivery, the supplier's capability to assist technical matters upon the purchaser's request is also important. (Chiou et al. 2008, 1910.)

Regarding criteria on green competencies, environmental management system and environmental performance, they mainly aim to reduce the environmental impacts of the procured goods or services. For example, cleaner production improves the environmental performance by using less material and energy (Nagel 2003, 12). Moreover, green design would make less environmental impacts during the whole product lifecycle which contains the selection of raw materials, production, marketing, usage and disposal. (Chiou et al. 2008, 1910.)

Regarding corporate social responsibilities, they contain criteria related to the company's image and its community. The supplier should public some reports to tract and inform its overall environmental record. Such public disclosure would help the community to recognize that the company is operating toward sustainability. Moreover, the green image relates to the market share changes and the relationship with stakeholders after implementing sustainable programs. Along with that, a company can involve key stakeholders in environmental activities and initiatives (Florida & Davison 2001, 79). With regard to contributions to community criterion, a potential supplier needs to set up a process that allows the local community to follow up and to give feedback on the company's operations. (Chiou et al. 2008, 1910.)

Last but not least, risk factor criteria include regulations, political stability, supplier's credit and internal management. Because of increasing regulations on environmental issues, the supplier has to acknowledge and update such new requirements. The political situation of the supplier's area can also impact the long-term relationship between the purchaser and the supplier. Furthermore, the supplier's credit related to both financial status and history performance is considered by the purchaser when selecting the supplier (Chan & Kumar 2007, 422). Finally, effective communication and cooperation in an organization would lead to success in solving both business and environmental issues (Zhu & Sarkis 2004, 62). The purchaser also looks at the internal management system of the supplier before making the selection decision. (Chiou et al. 2008, 1910-1911.)

2.4 Synthesis of circular economy and supplier selection

Since the circular economy requires diversity, system thinking and designing out waste, it is necessary to engage potential suppliers in the early stages of the procurement process and to build a long-term cooperation between the purchaser and the supplier. Along with that, in the utilization stage, a closer collaboration between the purchaser and suppliers

are highlighted. Such collaboration promotes the material's reuse and recycle which are two key principles of circular economy. As a result, the final waste would be minimized as much as possible. Furthermore, when selecting suppliers towards the circular economy, green criteria related to environmental and social aspects are added as key selection criteria in addition to traditional criteria. With knowledge from the literature, an initial synthesis framework is built as in figure 5.

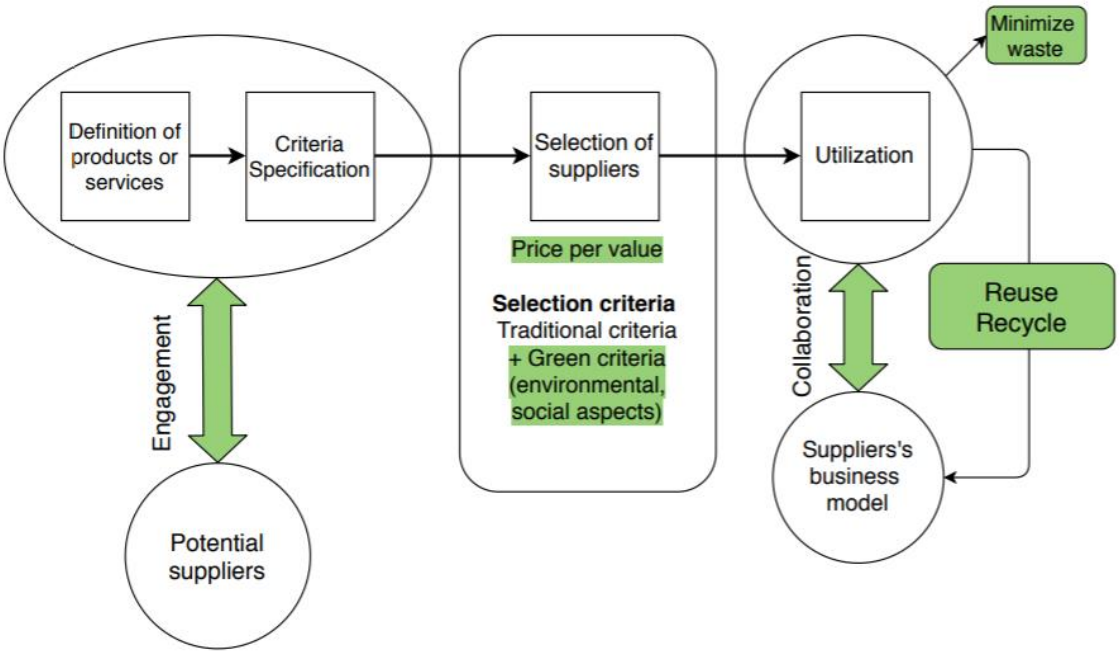


Figure 3 Initial framework of supplier selection in the circular economy

In the early stages of a procurement process, careful consideration of circular economy principles and characteristics is quintessential. In order to increase the products' values while minimizing the negative impacts on the environment as "Reduce" principle, the company needs to develop the products and services as well as to involve potential suppliers in product definition and specification stages. Potential suppliers' engagement would bring ideas to design products, to suggest renewable resources and further support diversity and system thinking in business.

The circular economy principles are "reduce, reuse and recycle" materials. When selecting suppliers in the circular economy, green criteria related to the environmental and social aspects are considered in addition to traditional criteria such as quality, price, deliver. Such green criteria consist of green competencies, environmental management system, environmental performance and corporate social responsibilities. (Govindan et

al. 2015; Chiou et al. 2008.) Especially, green criteria about the environmental management system are widely recognized., including a green image, environmental performance, environmental competencies, design for environment, green competencies, environmental efficiency, environmental authentication, environmental improvement cost, green logistic dimension, green organization activities, environmental certification and more (Govindan et al. 2015, 70). Along with that, instead of simply evaluating price per product unit, the purchaser would select a supplier based on the "price per service" that the supplier provides (Witjes & Lozano 2016, 41).

Furthermore, a circular business model requires the support and collaboration between the purchaser and the supplier (Planing 2015, 4, Witjes & Lozano 2016, 41). After selecting suppliers, the cooperation between the purchaser and the supplier in the supply and utilization stage is remained and becomes closer compared to that in the early stages. The collaboration contributes significantly to reuse and recycle products and services, to minimize the waste, and further support to close the loop of materials. The collaboration also supports both parties to share environmental and social responsibilities in the circular economy context.

3 METHODOLOGY

3.1 Qualitative research approach

According to Creswell (2007, 40), in order to answer the research questions, researchers would choose qualitative or quantitative methods. Regarding quantitative research, "Quantitative is predominantly used as a synonym for any data collection technique or data analysis that generates or uses numerical data" (Saunders et al. 2009, 151). The aim of quantitative research is testing objective theories by defining and examining the relationship among variables; therefore, researchers can test pre-set hypothesis in statistical means to obtain quantifiable results (Creswell 2007, 16). Regarding qualitative research, according to Saunders et al. (2009, 151), "qualitative is used predominantly as a synonym for any data collection technique or data analysis procedure that generates or use non-numerical data. Qualitative, therefore, can refer to data other than words, such as pictures and video clips". Qualitative research is often used when researchers try to understand the detail of the phenomenon, and it can be achieved through information shared by related stakeholders (Creswell 2007, 40).

Moreover, qualitative research often brings insights into the problem and answers the questions of "why" and "how" about the phenomenon; therefore, it is most often used in explanatory and exploratory research. (Saunders et al. 2009, 146.) Furthermore, qualitative study can be related to inductive or deductive approach, and assist researchers to develop theory from collected data. Such procedures are able to categorize the data and identify the relationships between these categories (Saunders et al. 2009, 480.)

In this research, qualitative research is the desired method to choose. The purpose of the research is to understand how suppliers are selected in the circular economy by analyzing how circular economy principles and characteristics affect the procurement process and selection criteria. When companies decide to follow sustainable development, their business models would become more circular and sustainable, which leads to the change in the procurement process. Therefore, it is possible to ask and examine how the process has been changed in practice. Moreover, the research concentrates on a real-life process and tries to explore new selection criteria in the circular economy context. As the circular economy is a relatively topical phenomenon, instead of forming hypothesizes at the beginning, data analysis would allow to reveal them.

Regarding qualitative research, there are multiple research methods such as ethnographic, case study, grounded theory, narrative and phenomenological, and these methods can be applied in a flexible manner (Malhotra & Birks 2007, 153). While each strategy has its own advantages, the researcher decides to use the case study approach because of the nature of this research. Meyer (2001, 331) states that the case study strategy is considered as an effective approach to examine processes in a specific environment. Besides, when the researcher has no control over the researched issues, the case study would be a proper choice, so that the nature of observed issues would not be manipulated (Rowley 2002, 17). Rowley (2002, 18) also suggests that the case study approach is sufficient when events are researched in their circumstances and where various data-collection methods are used. Moreover, because of the chosen geographical region and the limited of time, the case study is the suitable approach to gain an initial understanding of supplier section in circular economy practice.

3.2 Selection of cases

When following the case study strategy, researchers can either use a single case or multiple cases (Saunders et al. 2009, 146). Eisenhardt and Graebner (2007, 27) declare that "theory building from multiple cases typically yields more robust, generalizable, and testable theory than single-case research". Additionally, multiple case study is often characterized for extending existing theories as well as filling theoretical categories (Saunders et al. 2009, 146). Therefore, in this research, the researcher chooses multiple cases which is appropriate for the discussion of supplier selection procedure and criteria in the circular economy context. With multiple cases, the researcher could explore similarities or opposites in the researched issues among case companies, which support to generalize the findings.

The research concentrates on Finnish companies because Finland owns high reputation in pursuing the circular economy and the location is convenient for the researcher. With the fact that Finland is a forerunner in the circular economy and aims to make the country as a global circular economy leader by 2025, the Finnish government has prioritized investments promoting the circular economy among its current projects (Santalo 2019). Moreover, due to high awareness of climate change and resource scarcity, Finland is becoming one of the successful countries commencing and promoting the circular economy. The country was the first one to create a national circular economy roadmap, in 2016, and

hosted the first world circular economy forum in 2017 with the attention of ninety countries over the world (Palmberg 2019).

Since the purpose of this research is to understand the supplier selection activity in the circular economy context, the researcher decides to select case companies that are promoting the circular economy in practice. Based on several networks with stakeholders in smart sustainable city building, and information on interesting companies pursuing the circular economy in Finland presented on Sitra's website, the cases are selected using a practical process as follows:

- Based on internet search and networks for possible case companies
- Identification of seven possible case companies that mention the circular economy on their website or in press releases
- Email to each company for asking researching permission
- Contact the one that accepted and check out their public materials.

After that, three case companies expressed their interests to join the research.

Valonia is a service center for sustainable development and energy of Southwest Finland. As an unbiased regional advisory organization for municipalities and companies in matters regarding sustainability, the company offers a wide range of services to support municipalities and companies as well as communities and citizens to promote sustainable development, and recently to promote the circular economy.

Lounais-Suomen Jätehuolto Oy (LSJH) is a company owned by seventeen municipalities. On behalf of these municipalities, LSJH takes care of organizing the residents' waste management and waste disposal advice.

Lassila & Tikanoja Oyj (Lassila & Tikanoja) is a big international service company with a mission of making circular economy in reality. The company is a critical link in the shift to the circular economy by keeping materials, properties and factories in productive use for as long as possible, and enhancing the use of raw materials and energy.

Overall, three case companies are service providers in promoting circular economy in Finland; however, three cases have different perspectives on sustainable procurement. Particularly, Valonia provides consultant services about green procurement, LSJH is on the way to develop a sustainable procurement strategy, and Lassila & Tikanoja is considered as a representative case company having systematic procurement process.

3.3 Data collection

By using the case study strategy, there are various data collection techniques, for example, interviews, observation and documentary analysis and questionnaires. Such techniques "are likely to be used in combination" in research. (Saunders et al. 2009, 146.) Moreover, Saunders et al. (2009, 258) state that most researchers tend to use some combinations of secondary and primary data, especially when the secondary data are limited. In this research, the researcher uses both secondary data and primary data. Secondary data are collected by using documentary techniques, while primary data are collected through interviews.

Regarding secondary data, the data might be "raw data and published summaries" (Saunders et al. 2009, 256). According to Saunders et al. (2009, 146) the documentary secondary data include written materials such as magazine articles and reports, as well as non-written forms such as audio or video recordings. In business management research, such documentary secondary data are usually used as a part of the case study. (Saunders et al. 2009, 256-258.) This research uses secondary data as a mean to create a perception of the theoretical background of the research, to identify possible case companies and further to understand the case companies through public materials.

Regarding primary data, according to Malhotra and Birks (2007, 152), based on specific issues and purposes, primary data are generated by researchers. Such primary data provide the opportunities to researcher not only to ask about the phenomenon in questions, but also to observe the respondents in their natural environment. In a qualitative Master business research, the interview is the most common method to collect primary data (Fisher 2010, 182). The interview can help researchers to "gather valid and reliable data that are relevant to research questions and objectives" (Saunders et al. 2009, 318). With the purpose to examine how suppliers are selected in the circular economy context, the researcher desires to interview experts and procurement staff in green procurement. By using interview techniques, the researcher could ask and understand the case companies' procedures and criteria when selecting suppliers. Table 3 details the information of companies and interviewees in this research.

Table 3 List of companies and interviewees

Company	***Title of the interviewee***	***Company description***	***Interview date***	***Duration***
Valonia	Director	Valonia is a regional advisory organization for municipalities and companies in matters regarding sustainable development	02 March	30 mins
LSJH	Regional planner, PIC for developing procurement strategy	LSJH takes care of organizing the residents' waste management and waste disposal advice	10 March	37 mins
Lassila & Tikanoja	Category manager	Lassila & Tikanoja is a service company that makes circular economy a reality	23 March	28 mins

Overall, the interviewees play different roles in procurement management and own different perspectives on supplier section activities. Firstly, as a director of Valonia which provides consulting services for companies and municipalities in South-West Finland, the interviewee from Valonia has strong experience in sustainable procurement and is an expert in the field. Secondly, the interviewee from LSJH has focused on procurement and supply chain field for two years, and she is the person in charge of developing a sustainable procurement strategy for the company. Thirdly, the interviewee from Lassila & Tikanoja owns more than twenty years in supply chain management and is a category manager in Lassila & Tikanoja head office. Therefore, the interviewee from each company would bring some differences compared with the other two interviewees.

According to (Saunders et al. 2009, 318), the interview can be further classified as structured, semi-structured, in-depth and group interview. The researcher selects semi-structured interview because of its convenience of discussion on a given framework, and its flexibility. In the semi-structured interview, the researcher has a list of themes and questions in advance; however, the researcher can ask questions outside of the list, and the interviewees also can add further comments on important matters. (Saunders et al. 2009, 320-321.) In this research, the interview questions are created based on the literature and the synthesis framework, and are broken down into different themes. The terms

of procurement, purchasing, supplier selection can be used interchangeably, and the context of circular economy is rather new in practice. Therefore, it is also necessary to allow interviewees to answer the questions based on their own angle. Table 4 illustrates the relationship of the concepts reviewed in the literature, the interview questions as well as how the primary data are collected for the data analysis. The list of questions is detailed in Appendix 1 – Interview guide.

Table 4 Operational chart

Research problem	***Themes***	***Concepts***	***Concepts in literature (Chapter number)***	***Interview question(s)***
How the circular economy impacts the procurement process?	Circular economy	Circular economy principles and characteristics	2.1.1 – 2.1.2	1, 2
	Procurement	Procurement process	2.2.1	5
		Sustainable procurement	2.2.2	4, 6
What criteria are considered to select suppliers in the circular economy?	Supplier criteria	Traditional criteria	2.3.1	7
		Green criteria	2.3.2	7, 8

Interviews in this research were conducted during March 2020, either face-to-face or Skype meeting program, and lasted about 25 to 35 minutes. All three interviewees were asked with a similar interview guide although there is a slight change applied for interviewee in Valonia case because she plays as an expert role in green procurement. Moreover, the interviews were semi-structured, so that some different questions were added based on the answers of interviewees. The interviews were recorded with the permission of the interviewees and then transcribed to avoid misunderstanding and avoid missing information. The interviews were conducted in English as the interviewers and the researcher both speak English fluently. When the analysis was completed, the final report was sent to interviewees to ensure the accuracy of the information in the research.

3.4 Data analysis

The process of data analysis uses analytical interpretation to acknowledge information from the data and it aims to find meaning in data as well as to generate information for the researched topic. In qualitative research, data are non-numeric or have not been quantified, for example, a shortlist of responses, open-ended questionnaire or transcripts of in-depth interviews. In order to make these data to be useful, researchers need to implement data analysis (Saunders et al. 2009, 480). When analyzing qualitative data, the researchers need to combine connoisseurship and criticism, and the coding method is used to summary and précis the data (Fisher 2010, 199).

According to Malhotra and Birks (2007, 240), "coding is the process of bringing together participants responses into categories that bring together similar ideas, concepts, themes, or steps or stages in process". Anything which can reveal the data can be coded, such as any hesitations, emotional factors (Malhotra and Birks 2007, 240). Therefore, the researcher tries to transcript the data right after taking the interview and notes such factors in order to use when coding.

In this research, the data are analyzed based on the content analysis method. According to Fisher (2010, 201), this method "adds a qualitative element to the analysis of qualitative material". By using the content analysis method, the researcher analyzes the frequency of key elements appear in the collected data (Fisher 2010, 201). Furthermore, the researcher uses both within-case and cross-case analysis to examine primary data. According to Ayres et al. (2013, 881), through within-case analysis, the researcher can acknowledge the presence of themes that "lead to the identification of significant statements" then, cross-case analysis is applied to compare such statements. Therefore, in this research, the within-case is conducted by analyzing separately the interview's transcripts to recognize patterns. Each case is coded at one time by Nvivo software, and the researcher only moves to other cases after wrapping up coding previous cases. After that, these patterns are coded to allow for more abstract examination when the researcher implements cross-case analysis. Then the themes are compared to the remarkable points identified in the literature in order to find some connections which are described in Chapter 4.

3.5 Trustworthiness

According to Lincoln and Guba (1985), there are four main trustworthiness criteria that ensure qualitative findings, namely credibility, dependability, transferability and confirmability. In 1994, the authors added a fifth criterion which is authenticity.

Firstly, credibility relates to the accuracy of the collected data as well as the clarification and representation of such data by the researchers (Polit & Beck 2017). Cope (2014, 89) explains that if the description of human experience in the study is recognized immediately by individuals in a similar experience, it would be considered as a credible qualitative study. Besides, the researchers should prove the engagement, methods of observation in order to enhance the credibility of the research (Cope 2014, 89). In this research, the interviewees are introduced by the researcher's networks; therefore, it creates a positive sign of reliability between the interviewees and the researcher. All three interviewees are interested in the topic and are willing to participate in the interviews. Moreover, after analyzing the data, the transcripts are sent to the interviewees to comment and correct if needed.

Secondly, dependability indicates to the constancy of collected data over the same experience. A study would be considered as a dependable research when its findings are simulated in similar conditions. (Polit & Beck 2017.) In this research, a theoretical framework is built before collecting data, so that it accumulates literature knowledge of the topic and practical knowledge in procurement and sustainable development, which has impacts on research questions, interview questions and how the researcher analyzes the data.

Thirdly, confirmability refers to the ability of researchers to prove that the data present of participants answers and not the subjective opinions from the researchers (Polit & Beck 2017). According to Cope (2014, 89), confirmability can be demonstrated by explaining how results and interpretations were created and illustrating that the findings were obtained from the data. Therefore, in order to show confirmability, the researcher quotes several points from the interviewees' answers.

Fourthly, transferability implies the ability to apply the findings to other researches (Polit & Beck, 2017). A qualitative study meets the transferability requirement if the results are meaningful to individuals who are not related to the study and the readers can connect such results to their own experiences. Therefore, researchers are suggested to provide adequate information about interviewees and the research context, so that readers

can evaluate the findings. However, the transferability of a study may depend on the purpose of the study and only be relevant if the research can generalize about the phenomenon. (Cope 2014, 89.) In this research, the case companies are pioneers for circular economy and the interviewees are experts or have strong working experience in procurement, it can be assumed that the findings could be applied for both other studies and individuals who are interested in the sustainable supply chain.

Fifthly, authenticity refers to the capability and degree that the researchers express the experiences and feelings of the participants in a reliable manner (Polit & Beck 2017). Cope (2014, 89) cites that "by reporting in this descriptive approach, readers grasp the essence of the experience through the participant quotes". Besides quoting several opinions expressed by the interviewees, the researcher also examines the emotions of interviewees.

4 FINDINGS

4.1 Case 1 - Valonia

Valonia is a public organization, based within the regional council of Southwest Finland, and is a service center for municipalities in the topic of sustainable development, climate issues, circular economy, and nature conservation. Therefore, the company plays a significant role in the sustainability ecosystem. Valonia started focusing on sustainable development approximately twenty years ago through the progress on United Nation Agenda 21 program, and has been promoting the circular economy for four years. The company carries out a wide range of activities concerning energy efficiency and renewable energy, circular economy, mobility management, water protection and wastewater management as well as sustainable public procurements and environmental education.

As an expert in green procurement, the interviewee from Valonia emphasizes the importance of sustainable procurement in promoting the circular economy. While the "sustainability" term has become familiar in doing business, the circular economy is a new term and has not yet commonly used. However, the aims of circular economy also relate to sustainable development such as minimizing waste and protecting the environment. According to the interviewee, companies and municipalities are using a lot of budget for procurement. The interviewee agrees that selecting appropriate suppliers is a key strategy in an organization and is one of the biggest elements that bring significant impacts on promoting the circular economy. Therefore, it is essential for a company to develop a sustainable procurement strategy.

Nevertheless, according to the interviewee, municipalities and businesses still have weak resources on procurement know-how in promoting circular economy. In order to avoid unnecessary waste, it is important to define the actual needs of the company before selecting suppliers. The interviewee highlights that in sustainable procurement, the values of the products and services that the purchaser receives is more important than the products itself.

> *"When thinking about the circular economy, from the purchaser's point of view, it is very important to step a few steps back to look at what is actual need. For example, we don't procure a certain vehicle if the vehicle itself is not the need, the vehicle is a way of getting the actual need which is a hole on the ground. The vehicle is not the need, the hold on the ground*

> *may be the need or even something that will be in the hole. So that, in circular procurement, you need to step a further back and see what the actual need is." (Director of Valonia)*

The interviewee's opinion is in accordance with the report of UNEP (2011, 40-41) where the authors agree that "organizations that made most progress in sustainable procurement have often achieved success through "re-thinking" their needs". Although most literature of procurement does not highlight the step of defining the companies' actual needs, re-thinking the needs is necessary for companies following the circular economy. Because "Reduce" is a key principle of the circular economy, understanding the company's needs would help the purchaser to cut down the prodigality.

After specifying the need as well as the products or services that the company wants to procure, the purchaser would consider various criteria to select suppliers. In this stage, the interviewee comments that open discussion among the company and the market is a key difference between supplier selection in the linear economy and that in the circular economy.

> *"in the beginning phrase, it is important to open the discussion for a wide market. The purchasers, the public organization don't make a list of suppliers, but they open it to all sectors and companies to come up if they have something that they feel they could offer for the process." (Director of Valonia)*

Instead of defining products specifications and criteria by themselves, companies promoting circular economy would refer the opinions from different sectors within companies or from other stakeholders in the market such as suppliers, consumers and municipalities. This finding is in common with Planing (2015, 3-4) or Crespin-Mazet and Dontenwill (2012, 215) who conclude that the relationships with both business and non-business actors in the sustainable development would improve the position of a company towards sustainable development. These actors can come up with novel ideas to create environmental-friendly products which lead to the change in selection criteria. According to Crespin-Mazet and Dontenwill (2012, 215), such non-business actors would be labelling companies, technical experts, the government, the media, and regulatory agencies.

As a service provider to companies and municipalities, Valonia has provided a lot of counselling, events, project planning and educational materials to customers. Based on the experience in green procurement, the interviewee suggests several methods to engage suppliers at the beginning of the procurement process such as communication through events, workshops or official announcement on companies' website. However, she also

notices the importance of transparency in publishing information and choosing suppliers, so that every supplier has equal opportunities to participate. In literature, the transparency is a main characteristic of the circular economy. Besides the transparency about contract terms with customers and about cost structure (Ellen MacArthur Foundation 2013, 49), the transparency in communicating with the supplier is also significant in practice.

Regarding criteria when selecting suppliers, the interviewee explains that each product or service would follow a different list of specific criteria. Moreover, in different industries such as consumers goods, construction or transportation, the list of criteria might be dissimilar. Consequently, it is difficult to define criteria for all procurement. However, the interview indicates that green criteria are important next to traditional criteria in the context of promoting the circular economy. In recent literature, the various environmental criteria in selecting suppliers have been discussed. Lu et al. (2007), Govindan et al. (2015) and Chiou et al. (2008) also mention the increasing concern over environmental criteria. The interviewee agrees that although traditional criteria such as quality, price and service have been the most used criteria, green criteria related to environmental and social issues are developed and widely used.

Furthermore. according to the interviews, some green criteria might be new, and might be created through open discussion with various stakeholders in the early stages of procurement. She explains that the public might have ideas of green criteria, and then they discuss with the company. A new criterion usually requires a long process to be developed. If some municipalities create criteria for a certain procurement, other stakeholders also benefit from that. Therefore, the purchasers do not always need to create criteria by themselves and they can apply experience form others. Along with that, the cooperation between the purchaser and the supplier is essential since it is a two-way process.

> *"At the moment, we are still in process of developing green criteria because we can't create criteria that we don't have a supplier who can meet criteria, so it is a two-way process" (Director of Valonia)*

Based on the information provided by the interviewee in Valonia, a framework of supplier selection towards the circular economy is built and shown in figure 6.

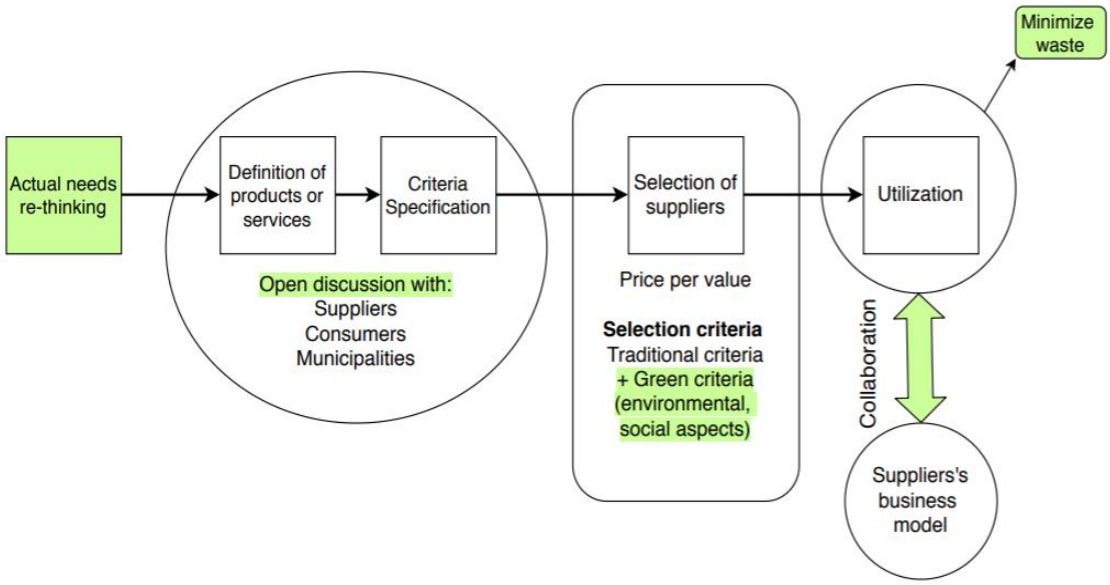


Figure 4 Framework of supplier selection towards the circular economy by Valonia

In this framework, the determination of actual needs at the beginning of the procurement process is emphasized. Besides, it is also important to organize open discussions with different stakeholders such as potential suppliers, consumers and municipalities in order to define the products or services as well as its specifications. Concerning the criteria for selecting suppliers, both traditional and green criteria related to environmental and social aspects are needed to consider together and equally. Along with that, the values of the provided products or service are concentrated when negotiating. After having a proper supplier, the collaboration between the purchaser and the supplier is maintained in order to achieve the aims in the circular economy.

4.2 Case 2 - Lounais-Suomen Jätehuolto

With the fact that waste has become a resource, and the customers' expectations of waste management services have increased together with the cost of operations, wider waste management cooperation became necessary. Therefore, LSJH was founded by merging two waste management companies in Turku and Salo in order to take care of the waste treatment duties in these areas and in other municipalities nearby. Focusing on the circular economy since 2015, LSJH is considered as a pioneer in promoting circular economy both in the company operations and the guidance in sustainable actions to customers and public services. The company pays a lot of attention to sorting and recycling waste, so that waste can be used as input materials in production.

Regarding the procurement process, according to the interviewee from LSJH, before buying something, the company certainly needs to define the needed products or services. She states that the procurement process for specific products or services might be different, and it is very important to understand and follow the company's guideline since buying decisions are key strategic activities. Because LSJH provides waste management services and is a pioneer in promoting the circular economy, the interviewee also emphasizes the significance of sharing knowledge among companies and suppliers, municipalities, other waste treatment companies in order to define specification and criteria for their needed products or services.

> *"We have to know in the market, or we have to talk to our suppliers or some companies, maybe they have some good products, some quality products. Good knowledge about what possible is important and it comes when we talk to the company, or maybe municipalities like Turku or Salo if they have something interested in." (Procurement specialist from LSJH)*

With regard to the importance of knowledge sharing, Preston (2002, 8) explains that the circular economy requires systematic changes, so it must be enclosed in partnerships and networks of companies. Since the company needs to synchronize its investments in infrastructure and innovation, collaboration would not only support such activities but also help to bring knowledge and skills together. Preston (2012, 8.) The circular economy targets to reduce the input from the beginning, and to extend the materials lifecycle as long as possible. This requires the involvement of the whole supply chain in a circular business model. Consequently, collaboration and value creation among various stakeholders would be essential to the success of the circular business model.

Regarding supplier selection criteria, the interviewee agrees that green criteria are important recently, and she would consider more about green criteria when choosing suppliers. However, it does not mean that traditional criteria are not considered thoughtfully. Traditional criteria such as price, delivery and service are still important, and play a significant part in choosing suppliers. With the fact that LSJH's business field is waste management, the company pays more attention to green criteria related to environmental performance and environmental management system of the supplies. Such green criteria are, for example, green design, green packaging, eco-label and waste management which are in accordance with a study by Chiou et al. (2008). Then the final decision would depend on the product type and the company strategy.

> *"Eco-label, green design, environmental management, delivery, service, maintenance, price. It depends on what we want, what we buy. In small*

cases, for example, when we buy toilet paper, we look for some suppliers having eco-labels, and the paper is recyclable. Mostly like what we buy in the shop" (Procurement specialist from LSJH)

The interviewee in this case also mentions that LSJH trusts its suppliers. The trust between the company and the supplier supports to improve cooperation between both parties. Hunt, et al. (2002, 19) clarify that relationships owning characteristics such as cooperation, trust, commitment and communication would lead to successful alliances. In the circular economy context, purchasing requires more room for innovation, as a result, trust, transparency and collaboration are significant.

Based on the information provided by the interviewee in LSJH, a framework of supplier selection towards the circular economy is illustrated in figure 7.

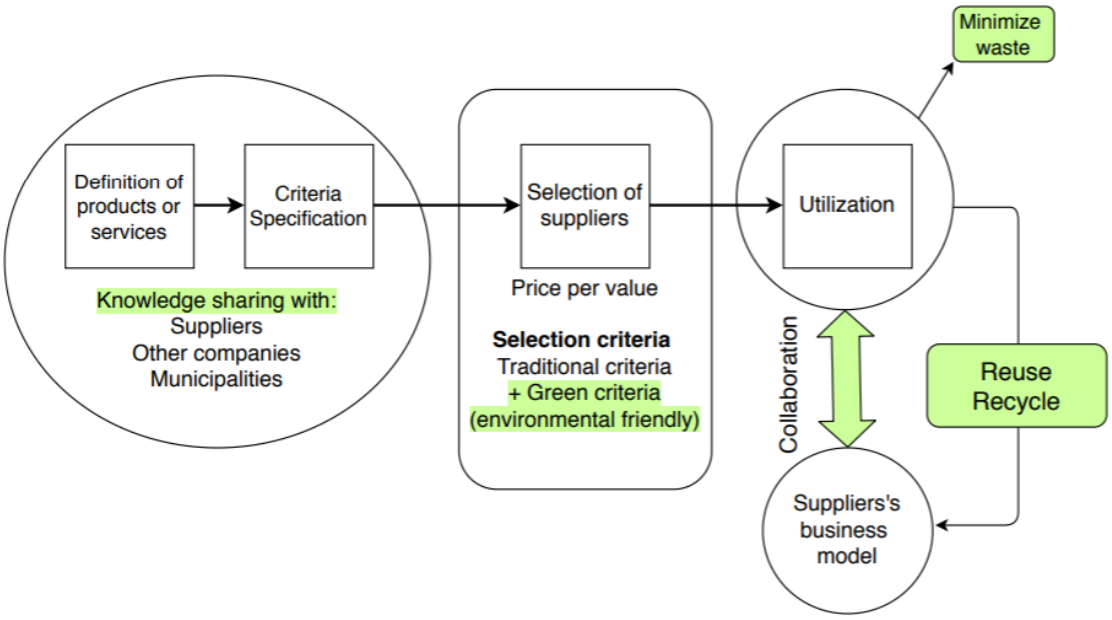


Figure 5 Framework of supplier selection towards the circular economy by LSJH

In LSJH, knowledge sharing is a key factor support the company to develop the circular economy business model. The new knowledge is not only from potential suppliers and municipalities but also from various stakeholders such as the market and other companies. When selecting suppliers, criteria related to environmental performance and environmental management system like eco-label and waste management are assessed carefully in addition to traditional criteria. The company puts attention in close collaboration with the supplier in order to extend the product lifecycle through reuse and recycle.

4.3 Case 3 - Lassila & Tikanoja

Lassila & Tikanoja's strategy is to create more values with the circular economy not only for customers, but also for personnel, owners and society. According to the interviewee, Lassila & Tikanoja aims at reusing everything, putting the waste as little as possible and taking care of the circular economy in practice. Through the environmental services, Lassila & Tikanoja circulates its customers' materials by taking care of the waste from home as well as industrial waste. Besides supporting corporate customers, the company helps households to become a part of the circular economy through environmental, industrial, facility, and technical services. The company creates more values for customers by improving the recycling rate, efficiency consumption. In addition, the company also creates values for personnel who are involved in the work in order to make sure that they have good health and enjoy their life after the working day. For society, Lassila & Tikanoja wants to mitigate climate change and tries to figure out new solutions for the circular economy. For example, recently, the company has replaced raw material with secondary raw material, and has replaced fuels with renewable bioenergy. The interviewee states that Lassila & Tikanoja has made more effort to apply circular principles for a while, and the company is proud to be a forerunner among Finnish companies promoting circular economy.

Having worked in procurement management for a long time, the interviewee agrees that the purchasing process has changed towards the circular economy. Along with the development of innovative technologies and the increasing concern over sustainability, both the methods and the criteria used to select supplier have been reforming. Particularly, in a big company like Lassila & Tikanoja, nowadays, the procurement process is more automated and is applied programs code. Before selecting suppliers, all potential suppliers have to fill in a formula with various questions. Besides a number of new criteria related to specific products or services, all suppliers have to comply with Lassila & Tikanoja's supplier code of conduct. The code of conduct is available on the company's website.

> *"Sometimes, we find a lot of suppliers for one product or service, and they need to fill the questionnaire. If we are making a tender round, we always attach it when we send a letter of tender and also our ethical the code of conduct. They are always included." (Category manager from Lassila & Tikanoja)*

In Lassila & Tikanoja's supplier code of conduct, there are many terms related to the ethical and social aspects of doing business. The company's code of conduct highlights the importance to follow the relevant laws and regulations, and to cherish the principles of sustainable development that help to save the raw materials, energy and environment. Some of those criteria are also mentioned by Chiou et al. (2008). For example, with regard to government's and local's rules, Chiou et al. (2008, 1910) explain that due to increasing regulations on environmental issues, the supplier has to update and follow such new rules. Therefore, the Lassila & Tikanoja's code of conduct acts as a guideline in the whole procurement process. The interviewee reveals that she can not take the new supplier without including the code conduct in the agreement. However, according to the interviewee, the most important criteria is that the supplier is able to sell what the purchaser's need.

Furthermore, as described by the interviewee, the formula includes a number of questions related to the supplier's organization, ethical principles, labor treatment, quality issues, production and environmental emission, safety principles, financial safety and more. During the interview, more than 50 questions in the formula are listed. Overall, the formula covers all criteria which are reviewed in the literature. Some more criteria related to, for example, ethical aspects, occupation system and safety are added.

In accordance with Weber et al. (1991, 14) finding, Lassila & Tikanoja has applied a linear weighting model to assess suppliers. After receiving the supplier's information, the Lassila & Tikanoja's purchaser would make an assessment in the scale of 1 to 3, with 1 indicating a poor level and 3 indicating a satisfactory level. The assessment would be implemented automatically through a system since the questions are made in Yes/No options.

> *"It an automatic questionnaire and they are supposed to fill in Yes in everything. If they fill in No, they get a red mark and lower points. So the question counts the points. There are some points which are kind of critical. If you answer No, we have to cut immediately. For example, if they are not taking care of the environmental things or they are dangerous at work, we can not work with them and we need to cut down immediately. But if there is something, they can make an improvement, we might give them some time. And if they are accessed as poor level, we are not able to work with them" (Category manager from Lassila & Tikanoja)*

Furthermore, after selecting a suitable supplier, the interviewee also agrees on the necessary to keep collaborating with the supplier in the utilization stage. Besides, Lassila & Tikanoja has an audit program based on the risk's assessment, so that the chosen suppliers

are evaluated every year. That means the purchaser has to visit the supplier, and the supplier also has to fill in another similar formula. This evaluation stage is also mentioned in the purchasing process model illustrated by Weele (2009, 13)

Based on the information provided by the interviewee in Lassila & Tikanoja, a framework of supplier selection towards the circular economy is illustrated in figure 8.

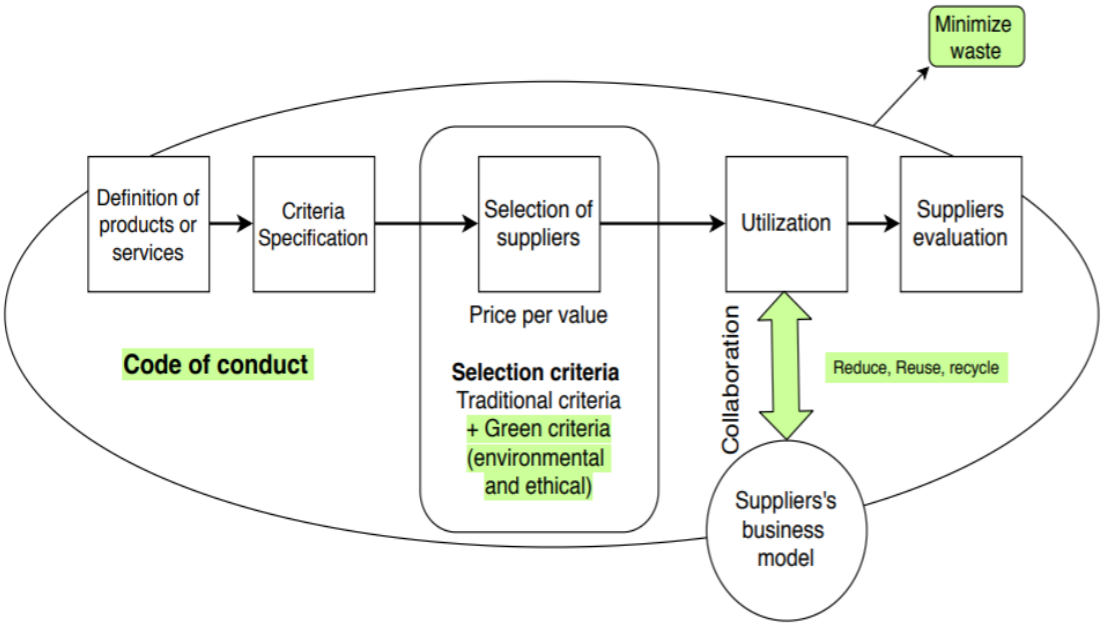


Figure 6 Framework of supplier selection towards the circular economy by Lassila & Tikanoja

With many years of experience in sustainable development and owning a strong sustainable procurement management strategy, Lassila & Tikanoja has a fixed procedure to select suppliers with a long list of specific criteria. Noticeably, besides traditional criteria and green criteria related to environmental issues, Lassila & Tikanoja also put high attention on corporation social and ethical matters. Such matters might be related to the working environment of suppliers as well as ethical and safety principles. Then, the company has a system to re-evaluate the suppliers periodically in order to ensure that their suppliers are still meet the criteria and Lassila & Tikanoja's code of conduct.

4.4 Cross-case analysis and a revised framework

All three case companies pursue sustainable development for a long time and have provided services on circular economy approximately for four or five years. Although playing in different roles in promoting the circular economy, three interviewees acknowledge the aim of the circular economy is to eliminate environmental harmful effects as much as possible based on three principles of "reduce, reuse and recycle". As suggested by the interviewee in Valonia, the purchaser should step back to re-think about the actual needs, and to define the needed values from or services. In order to promote the circular economy, interviewees from Valonia and LSJH highlight open discussion among various stakeholders such as suppliers, municipalities and market, especially in the process of product design. Although the interviewee in Lassila & Tikanoja does not mention much about open communication, the company webpage emphasizes key stakeholders in circular economy building, including customers, personnel, potential employees, investors, authorities, media, suppliers and communities. It is explained by Planing (2015, 3-4) or Crespin-Mazet and Dontenwill (2012, 215), that a transformation towards a circular economy requires a change in system thinking which involves whole parties in the value chain.

The finding shows that open innovation is applied in the early stages of the procurement process. Since the transition towards the circular economy is applied in accordance with open innovation and requires radical system change, companies tend to open discussion and to apply knowledge sharing with various stakeholders in the circular economy. Three case companies develop the circular economy since it relates to companies' values and strategy, or the government requirement. In order to pursue the circular economy, the companies combine organizational knowledge with external organizational knowledge to the value chain. Particularly, in the beginning stage of the procurement process, the companies opened doors to ideas coming not only from their suppliers, but also from customers, competitors and market. Regarding the relationship between sustainability and innovation, Nidumolu et al. (2009, 64) explain that "sustainability is a key driver of innovation" and Chen et al. (2006, 332) define green innovation as a hard or soft innovation that has a connection with eco-friendly products designs, green processes with energy-saving, waste recycling, or environmental management. This orientation would be gained through the organization's self-awareness or through external factors such as regulations and law (Lopes et al. 2017, 479).

Concerning the supplier selection criteria, three case companies agree that it is challenging to define a list of specific criteria for whole procurement. Both traditional and

green criteria are vital in selecting supplier towards the circular economy, and it is difficult to compare which criteria are more important than another one. This research's finding reveals that criteria related to social and ethical aspects are also considered when selecting suppliers. In the literature, the circular economy concept usually focuses more on environmental aspects; therefore, the green criteria related to environmental management system have gained more attention. Such criteria have shown and reviewed in the literature of Chiou et al. (2008), Lu et al. (2007) and Govindan et al. (2015). However, besides of considering on environmental issues, the interviewee from Lassila & Tikanoja also emphasizes the importance of the company's code of conduct when selecting suppliers. Although Chiou et al. (2008) mention criteria related to corporate social responsibilities, these social criteria still lack attention in most literature. The finding is in accordance with a result from Kirchherr et al. (2017, 221) who acknowledge the neglect of social and ethical issues in the literature about the circular economy. Moreover, the interviewees from Valonia and LSJH believe that some criteria are new and have not existed yet; therefore, criteria development also needs cooperation between related parties.

Because long-term collaborations between the purchaser and the supplier are essential in the circular economy, all three interviewees stress the importance of transparency in supplier selection activities and mutual trust. Hunt et al. (2002, 24) clarify that shared values and effective communication can help to gain trust among parties, whereas a partner's opportunistic behavior would negatively affect trust. Negative experiences would lead to a lack of trust between both parties (Hunt et al. 2002, 24). As a result, the tendering information and process have to be clear and transparent. Furthermore, because transparency is a characteristic of the circular economy, it is also highlighted when finding and selecting suppliers. In the general circular economy concept, transparency within the value chain might refer to the information of raw materials that used to manufacture products, so that the company can reuse such materials. However, when analyzing more about the supplier selection activities, transparency also can be understood as the clarity of sharing demand information as well as seeking, selecting and evaluating suppliers. In order to improve transparency in the circular economy, the case companies also suggest open communication between both parties.

After the data analysis, a framework of supplier selection towards the circular economy is revised in figure 9.

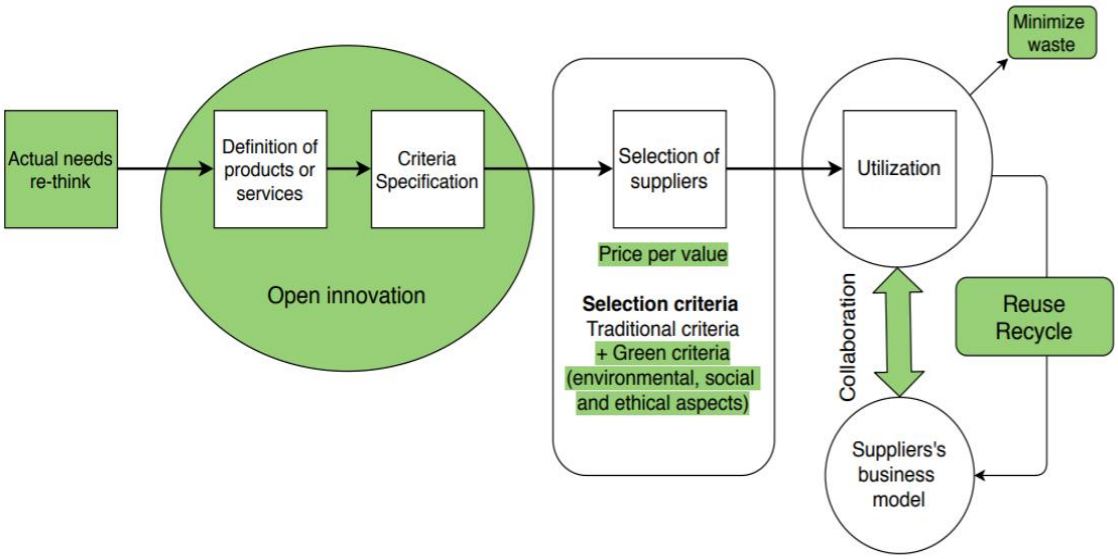


Figure 7 Revised framework of supplier selection towards the circular economy

Compared to the initial framework that was built in section 2.4, this revised framework shows three key differences. Firstly, in order to eliminate waste, at the beginning of the procurement process, the purchaser should re-think about the actual needs. Secondly, instead of engaging only potential suppliers in the early stages of the procurement process, more stakeholders in the circular economy are involved. Thirdly, regarding supplier selection criteria, criteria related to ethical aspects are added, in addition to traditional and green criteria about the environmental and social aspects.

5 CONCLUSION

5.1 Theoretical discussion

The circular economy is understood as closed loops and is a strategic facilitator of whole value chain developments. When moving towards the circular economy, companies are adopting a system innovation in the procurement process. Jesus and Mendonça (2018, 85) argue that "the innovation system's view should not be lost when considering the transition towards the circular economy". A multidimensional circular economy does not only involve technological innovation, but also institutional change in markets, public policies and social practices (Jesus & Mendonça 2018, 85). Furthermore, Yang et al. (2015, 3856) list a number of advantages for alliance forming, including resolving competitive conflicts, obtaining better learning benefits, developing innovative products, dealing with market uncertainty, and improving technical skills. Therefore, the collaboration between various stakeholders is crucial in promoting the circular economy. In the early stages of the sustainable procurement process, open discussion and knowledge sharing between stakeholders could create ideas to promote the circular economy. Besides emphasizing the collaboration between the purchaser and the supplier, this research also highlights the cooperation between the purchaser and other stakeholders in selecting suppliers in the circular economy context.

As in the literature, "Reduce" is the first principles of the circular economy, and it usually focuses on resources efficiency and less consumption. On the consumption side, a solution of building a simpler lifestyle is suggested (Figge et al. 2014, 217). In accordance with that, this research suggests the procurer should re-think actual needs at the beginning of the procurement process. In the circular economy, the purchaser focuses on the values that products or services bring to instead of the ownership of such procured products or services. The actual needs re-thinking step would help the purchaser not only to find the suitable supplier who can supply for the needs but also to reduce the waste from unnecessary goods.

Furthermore, trust and transparency are significant to find supplier towards the circular economy. The researcher agrees with literature that long-term alliance between the purchaser and the supplier could be considered as a method to organize closed resource loops. However, in order to build a long-term collaboration, trust and transparency between both parties are crucial. According to Kaats & Opheij (2014), the differences in norms, values,

culture and languages can be barriers for inter-organizational cooperation. As a result, when selecting the supplier, the purchaser would choose the supplier who shares similar values and goals towards the circular economy. It would boost the communication, cooperation and trust between both parties. That might be a reason for using the code of conduct in developing sustainable procurement in practice. Moreover, transparency about published information and selection process would also help to build trust and collaboration between the purchaser and the supplier selection in the circular economy.

Besides criteria related to environmental aspects such as environmental management system and environmental efficiency, criteria related to social and ethical aspects also are considered as important as traditional selecting criteria. In literature, the circular economy concept focuses more on environmental quality; however, the final aim of companies promoting the circular economy is ranging from economic, environmental and social pillars. Regarding supplier selection criteria in the circular economy, in addition to the criteria of green supplier selection that are reviewed in the literature, this research adds new criteria concerning ethical issues. At the same time, the green criteria on social and ethical matters need to be studied more extensively as the environmental criteria. Due to the adding of green criteria, the main negotiation between the purchaser and the supplier in circular procurement framework is “price per service” which is in accordance with the finding by Witjes and Lozano (2016).

5.2 Managerial implications

Besides theoretical implications, this research also brings implications for companies pursuing the circular economy or sustainable development. The focus of the research is to understand how the circular economy affects the procurement process and to examine what criteria used in selecting suppliers in the circular economy context. The selected case companies own high reputation in sustainable development and are considered as pioneers in promoting circular economy in Finland. As a consequence, this research would help the purchasers to build and to develop their companies’ sustainable procurement strategies. For instance, this research would bring some ideas to engage stakeholders, especially the suppliers in the procurement process. Through this research, the purchasers also can improve the companies’ criteria lists in selecting supplier as well as develop the companies’ code of conduct.

In addition, this research also supports the suppliers to acknowledge the criteria and the process that the purchasers use to select suppliers. By understanding such information, the supplier would improve their companies' strategies in products development, organizational management and marketing which might bring positive points in the tender round.

Moreover, for individuals who are interested in innovation and sustainability, understanding sustainability, and the circular economy pillars in practice would bring more opportunities to be a part of the global workforce. Especially, for individuals building a career in the supply chain field, the knowledge related to sustainability and the circular economy would support them to get a position in companies which pursue sustainable development goals.

5.3 Limitations and future studies

This research focuses on analyzing how the circular economy impacts the procurement process and examining the supplier selection criteria; however, this research does not analyze the methods used to select suppliers in companies. When selecting the supplier, the purchaser might use several methods such as the analytic hierarchy process, the analytic network and chi square-test (Govindan et al. 2015, 81). As a result, a future study on supplier selection methods could be done to get a better understanding of the whole activity in the circular economy context.

Furthermore, since this research's case companies are service providers in Finland, the researcher suggests future studies on other circular business models such as renewability or resource efficiency. Such business models would bring more insights on how the purchaser and the supplier can collaborate to reuse and recycle the material in the circular economy. Besides, this research only uses the qualitative data collection techniques; therefore, the detail supplier selection criteria used in practice have not been listed. Future research can combine both quantitative and qualitative data to understand more details about selection criteria.

6 SUMMARY

When the world is following sustainable development, the circular economy is a new term that developed countries are concentrating on. Instead of doing business with the linear model of make-take-dispose, more companies have been promoting to circular economy pursue in order to develop sustainability. Along with that, the company's business models and strategies are transforming to more sustainable solutions, and the activities of supplier selection would support such transformation.

The purpose of this research is to examine the supplier selection activity in companies promoting circular economy. As supplier selection is a stage in the procurement process, to achieve the research aim, one sub-question is applied to analyze the impact of the circular economy on the general procurement process. In order to understand the circular economy term and context, the principles and characteristics of the circular economy are clarified before answering the first sub-question. Besides, the second sub-question reveals the criteria considered to select suppliers in the circular economy context. An initial framework was built from existing literature.

All three Finnish case companies are service providers in promoting circular economy with different situations in developing procurement strategy. Primary data are collected by using qualitative methodology with semi-structured interview questions. Besides, secondary data are collected based on the information on case companies' webpage. Then, the data are analyzed first within-case, and following cross-case cases analysis through Nvivo system to recognize the similarities and differences among the case companies.

The findings from this paper suggest that case companies tend to build long term collaboration with various stakeholders including suppliers to develop circular economy ecosystem, and in order to strengthen such collaboration, trust and transparency play significant roles. From the beginning of the procurement process, it is important to re-think and to define the actual needs that companies desire to purchase. Moreover, when selecting suppliers, both traditional criteria and green criteria related to environmental, social and ethical aspects are considered. Therefore, the purchaser would focus on price per value that suppliers provide to make the selection decision.

Such findings bring more insights into understanding the supplier selection towards the circular economy in practice. It is also helpful for companies building procurement strategy to promote the circular economy, and also companies supplying materials or services to participate in the sustainable market.

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APPENDIX 1 - INTERVIEW GUIDE

Theme 1: Background questions

1. Can you tell me what your company does?

2. How long has your company focused on the circular economy and what were the reasons to focus on it?

3. Tell me about your own background in relation to procurement management?

Theme 2: Procurement Process

4. Could you describe the process to select suppliers in order to promote the circular economy?

5. How it has changed since the inclusion of the circular economy?

6. How engaged suppliers are important?

    a. Are suppliers engaged to product design in order to promote the circular economy?

    b. Could you tell an example, how this happens in practice?

Theme 3: Criteria

7. What criteria are used when selecting supplier?

    a. How do your company come up with those criteria?

8. How important of green criteria when selecting supplier?

Theme 4: Ending question

9. Would you like to comment on anything else?

APPENDIX 2 – THEMES

Circular economy
Clean technology
Law
Material consumption
Municipalities
Innovation
Service thinking
Sustainable development
System thinking
Cooperation
Alliance
Communication
Knowledge sharing
Open discussion
Supplier engagement
Criteria
Code of conduct
Delivery, Price
Environmental
Eco-friendly
Eco-label
Emission
Ethical
Material
Service
Social
Two-way process
Procurement
Evaluation
Invite suppliers
Needs
Points
Process
Strategy
Transparency
Trust